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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/026,001	12/21/2001	Charles A. Nicolette	GZ 2108.00	5913

7590

12/30/2004

Michele Todd Wasmuth
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Suite 1800
Three Embarcadero Center
San Francisco, CA 94111

EXAMINER

YU, MISOOK

ART UNIT	PAPER NUMBER
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1642

DATE MAILED: 12/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/026,001

Applicant(s)

NICOLETTE, CHARLES A.

Examiner

MISOOK YU, Ph.D.

Art Unit

1642

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) 5-40 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 03/14/02, 03/12/03, 04/02/03

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☒ Other: Exhibit A (Seq. Alignment)

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DETAILED ACTION

Election/Restrictions

Applicant's election of group I encompassing claims 1-4, drawn to compositions comprising a protein and peptides in the reply filed on 10/20/2004 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claims 5-40 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim.

Claims 1-40 are pending, and claims 1-4 are examined on merits.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "the same native ligand" in line 3. There is insufficient antecedent basis for this limitation in the claim. For compact prosecution purpose, the Office assumes "the same native ligand" to be a human cytokeratin 18 (CK18) for art search purpose, since the specification discloses cytokeratin 18 (CK18) only as an native ligand. However, this treatment does not relieve applicant the burden of responding this rejection.

The dependent claims 2-4 are also rejected because the dependent claims include the rejected limitation, but do not further clarify the rejected limitation.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1, and 2 are rejected under 35 USC 101 because the claimed invention is directed to non-statutory subject matter.

Claims 1, and 2, as written, do not sufficiently distinguish over nucleic acids, as they exist naturally because the claims do not particularly point out any non-naturally occurring differences between the claimed products and the naturally occurring products. In the absence of the hand of man, the naturally occurring products are considered non-statutory subject matter. See *Diamond v. Chakrabarty*, 447 U.S. 303, 206 USPQ 193 (1980). The claims should be amended to indicate the hand of the inventor, e.g., by insertion of "Isolated" or "Purified" in front of "immunogenic ligand" in line 1 of claims 1, and 2. See MPEP 2105.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4 are rejected under 35 U.S.C. 102(b) as being anticipated by WO 95/31728 (23 November 1995, #9 of IDS filed on 03/11/2003).

Claims 1-4 are interpreted as drawn to a composition comprising at least one immunogenic ligand, wherein said immunogenic ligand is selected from an immunogen

comprising SEQ ID NOs: 3, 5, or 7, wherein said ligand elicit an immune response against CK18 (the base claim 1), wherein said composition of the base claim further comprises an immunogenic portion of SEQ ID NO:1 (claim 2), wherein said composition comprises a carrier. Since the claims 1-3 as currently construed do not have a transitional phrase (note the limitation “selected from the group consisting of SEQ ID NOs:3, 5, and 7” in line 4 of claim 1 is a Markush format indicating the alternate choice, not a transitional phrase), the scope of the claimed “immunogenic ligand” is broadly interpreted as drawn to an immunogen **comprising** SEQ ID NO:7.

WO 95/31728 at pages 15-18, Examples 4-6, teaches a composition, i.e. “immunogen” comprising immunogenic ligand, wherein said immunogenic ligand comprising SEQ ID NO:7 (note lines 26-28 of page 15 “fusion proteins consisting of 260 amino acids of the T7 gene 10 protein and amino acids 140-430 of human CK18”, which comprises the instant SEQ ID NO:7, i.e. the 10-mer polypeptide of FMKKNHEEEV, and also comprises an immunogenic portion of SEQ ID NO:1 according to the sequence search result from the protein database PIR, note Exhibit A (the sequence alignment of instant SEQ IS NO:1 against Genbank accession number S05481, i.e. the human keratin 18), which shows that amino acids #140-430 of human CK18 comprises instant SEQ ID NO:7. WO 95/31728 especially Example 5 at page 16-17, Table 4 teaches that the antibodies produced by the composition comprising the immunogen reacts to CK18 present in blood samples from a human subject, and cancer patients, thus the immunogen of WO 95/31728 has “ability to elicit an immune response against the same native ligand”. As for “a carrier” in claim 3, and a pharmaceutically acceptable carrier in

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claim 4, the immunogen comprising the fusion proteins consisting of 260 amino acids of the T7 gene 10 protein and amino acids 140-430 of human CK 18 being injected into Balb/c mouse inherently has a pharmaceutically acceptable carrier because it is the Office's position that injection of immunogen into in vivo subject inherently has "a pharmaceutically acceptable carrier" Note the broad definition of the specification at paragraph [0108] for the term "pharmaceutically acceptable carrier" as encompassing "any of the standard pharmaceutical carriers, such as a phosphate buffered saline solution, water, and emulsions, such as an oil/water or water/oil emulsion, and various types of wetting agents. The compositions also can include stabilizers and preservatives."

WO 95/31728 does not disclose amino acids of cytokeratin-18, however, cytokeratin-18 of WO 95/31728 patent appears to possess the same structure and same function as the instantly claimed invention. The Office does not have the facilities and resources to provide the factual evidence needed in order to establish that the composition of the prior art does not possess the same material, structural and functional characteristics of the instantly claimed composition. In the absence of evidence to the contrary, the burden is on the applicant to prove that the claimed composition is different from those taught by the prior art and to establish patentable differences. See *In re Best* 562 F.2d 1252, 195 USPQ 430 (CCPA 1977) and *Ex parte Gray* 10 USPQ 2d 1922 (PTO Bd. Pat. App. & Int. 1989).

Claims 1-4 are rejected under 35 U.S.C. 102(b) as being anticipated by US Pat. 5,780,032 (14 July 1998, #1 of IDS filed on 03/11/2003).

Claims 1-4 are interpreted as drawn to a composition comprising an immunogenic ligand, wherein said immunogenic ligand is selected from an immunogen comprising SEQ ID NO: 7, wherein said ligand elicit an immune response against CK18 (the base claim 1), wherein said composition of the base claim further comprises an immunogenic portion of SEQ ID NO:1 9 (claim 2), wherein said composition comprises a carrier, wherein a said carrier is a pharmaceutically acceptable carrier (claim 4). Since the limitation “selected from the group consisting of SEQ ID NOs:3, 5, and 7” in line 4 of claim 1 is a Markush format indicating the alternate choice, not a transitional phrase, the scope of an immunogenic ligand is broadly interpreted as drawn to a composition comprising an immunogen comprising SEQ ID NO:7.

US Pat. 5,780,032 teaches a composition comprising cytokeratin 18 in PBS at column 3, lines 27-29. Note the attached sequence alignment (Exhibit A) showing that cytokeratin 18 comprises instant SEQ ID NO:7 in the middle of the 430 amino acid protein, and cytokeratin 18 is identical to instant SEQ ID NO:1. The ‘032 patent teaches that the fragments from the cytokeratin could be used as immunogen i.e., the protein fragments can elicit an immune response against cytokeratin-18 (note abstract, Fig. 1, and 18 for example).

The ‘032 patent does not disclose amino acids of cytokeratin-18, however, cytokeratin-18 of the 032 patent appears to possess the same structure and same function as the instantly claimed invention. The Office does not have the facilities and resources to provide the factual evidence needed in order to establish that the composition of the prior art does not possess the same material, structural and functional characteristics of the instantly claimed composition. In the absence of evidence to the contrary, the burden is on the applicant to prove that the claimed composition is different from those taught by the prior art and to establish patentable differences.

See In re Best 562F.2d 1252, 195 USPQ 430 (CCPA 1977) and Ex parte Gray 10 USPQ 2d 1922 (PTO Bd. Pat. App. & Int. 1989).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MISOOK YU, Ph.D. whose telephone number is 571-272-0839. The examiner can normally be reached on 8 A.M. to 5:30 P.M., every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jeffrey C Siew can be reached on 571-272-0787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MISOOK YU, Ph.D.
Examiner
Art Unit 1642

A handwritten signature in black ink, appearing to read 'Misook Yu', followed by a long horizontal stroke.

1	2120	100.0	430	2	S05481	keratin 19, type I
2	1808.5	85.3	423	2	T59453	keratin, type I, c
3	1137.5	53.7	368	2	A28825	keratin, type I, no
4	917.5	43.3	472	1	KRHU6	keratin 14, type I
5	904.5	42.7	452	2	I49555	cytokeratin 15 - m
6	891.5	42.1	473	2	J04313	keratin 16, type I
7	889.5	42.0	399	2	A25470	cytokeratin 19 - b
8	887	41.8	456	1	KRHU5	keratin 15, type I
9	880.5	41.5	403	2	J00028	cytokeratin 19 - m
10	871.5	41.1	460	1	KRHU9	keratin 19, type I
11	870.5	41.1	467	2	I50476	keratin type I - g
12	865.5	40.8	432	2	S30433	keratin 17, type I
13	862.5	40.7	401	2	S57657	keratin type I - g
14	847.5	40.0	458	1	KRHU3	keratin 19 - potol
15	846	39.9	437	2	A55682	keratin 13, type I
16	843.5	39.8	420	2	A37343	keratin 13, type I
17	839.5	39.6	593	1	KRHU0	keratin 13, type I
18	839	39.6	526	1	KRHU01	keratin 10, type I
19	831	39.2	433	2	S01631	keratin, 54k type
20	817	38.5	569	1	KRMSH1	keratin, type I, e
21	815.5	38.5	561	2	A31994	keratin, 58k type
22	813.5	38.4	419	2	A25458	keratin 10, type I
23	813	38.3	424	2	S17780	keratin, type I cy
24	811	38.3	483	2	A55033	keratin 20, type I
25	810.5	38.2	359	2	B26115	keratin 12 - mouse
26	804	37.9	429	2	A25145	keratin, 52k type
27	800.5	37.8	486	1	KRXL	keratin, 47k type
28	796.5	37.6	411	2	S45318	keratin 3, type I,
29	786.5	37.1	473	4	A33652	keratin 12 - rabb
						probable keratin 1

30	779.5	36.8	429	2	A40455	keratin 21, type I
31	769.5	36.3	570	2	S07330	keratin, epidermal
32	762.5	36.0	412	1	K8SHL1	keratin, 48K type
33	748.5	35.3	416	2	A61404	keratin A, type I
34	744.5	35.1	404	2	JS0073	keratin, 47.6K type
35	740.5	34.9	416	2	S60034	keratin Ha1, type
36	739.5	34.9	416	2	A46559	keratin, type I, h
37	725.5	34.2	392	2	A60777	keratin 2, type I,
38	722	34.1	407	2	I48739	MhA2 (keratin acid)
39	712	33.6	362	2	I37459	keratin Ha3-II, ty
40	703	33.2	622	2	I37984	keratin 9, type I,
41	696.5	32.9	327	2	S04511	keratin 3, type I,
42	618.5	29.2	323	2	I48667	MhA3 (keratin acid)
43	572	27.0	483	2	A34720	keratin 8, type II
44	570	26.9	466	2	A25074	vimentin - human
45	567	26.7	464	2	A56600	intermediate filament

ALIGNMENTS

RESULT 1

keratin 18, type I, cytoskeletal - human

N/Alternate names: cytokeratin 18
C/Species: Homo sapiens (man)

C:\Accession: S05481; S05482; S06889
C:\Date: 07-Sep-1990 #sequence_revision 07-Sep-1990 #ext_change 09-Jul-2004

R;Oshima, R.G.; Millan, J.L.; Cecena, G
Differentiation 33, 61-68, 1986

A, Title: Comparison of mouse and human keratin 18: a component of intermediate filament
A, Reference number: S05481, MID:87134778, PMID:2434380

A;Accession: S05481
A;Molecule type: mRNA

A;Residues: 1-430 <OSH>
A;Cross-references: UNIPROT: P05783; EMBL: X12861; NID: g34036; PIDN: CAA31375.1; PID: g34033

R.; Romano, V.; Hatzfeld, M.; Magin, T.M.; Zimbelmann, R.; Franke, W.W.; Maier, G.; Ponsch Differenziation 30, 244-253, 1986

A:Title: Cytokeatin expression in simple epithelia. I. Identification of mRNA coding I
A:Reference number: S05482; MID:86193258; PMID:2422083

A:Accession: S05482
A:Molecule type: mRNA

A:Residues: 199-201,'O', 203-245,'S', 247-308,'R', 310-311,'R', 313-430 <ROM>
N:Cross-References: EMBL:X12876; NID:g34034; PIRN:CAA31369.1; PID:g34035

A; Note: part of this sequence was confirmed by protein sequencing

A: Title: Cytokeratin expression in simple epithelia.
Differentiation 33, 69-85, 1986

A: Accession: S06889
A: Reference number: S06888; MUID: 87134779; PMID: 2434381

A:Residues: 7-430 cLEIS
A:Molecule type: mRNA
Accession: 500005

A: Accession: F-350 SUB2
 B: Cross-references: EMBL: X12883
 C: Genetics: NID: g30310; PIDN: CAA31377.1; PID: g30311

C/Gene: GDB:KRT18
 A/Gene: GDB:KRT18
 R/Cross-References: GDB:120127, OMIM:148070

A;Map position: 17p12-17p11
A;Cross-references: GDB:120127; OMIM:
A;Gene family: avcokelot3 korat3

C:superficially: cytoskeletal keratin
C:Keywords: coiled coil; intermediate filament
E: 430/Protein: keratin 18, type I (keratohelical) #status: undiagnosed -MAY 2007

Query Match: 100.0% Score 3120. DB 3. Length 410.
E:/2-430/Product: keratin 18, type 1, cytoskeletal #status predicted <max>

Query Match	100.0%;	Score 2120;	DB 2;	Length 430;
Best Local Similarity	100.0%;	Pred. No. 1.7e-96;		

```
Matches 430; Conservative 0; Mismatches 0; Indels 0; Gaps 0
```

MSFTTSTSTNYRSLGSVQAPSYGARPVSSAASVYAGAGSSGSRISVSRSRSTSPRGGMGS 600

Db 1 MSFTSTPTSTNYRSLGSVQAPSPYIGARPVSSAASVYAGAGSSSRISVSNTSIFRGMGS 60

61 GGLATGIAGSLAGMGIGIQNEKETNOSLNDRLASLYLDRVSRLEENRRLSEKIRREHLEKKG 120

Db 61 GGLATGIAGGLAMGGIQNEKETNQSLNDRLLSYLDKVRSLLENRRLESKRIRHHELEKGG 120

121 PVRDMSHYFKIIEEDLPAQIFANTVDNARIYQIDNARLAADDPRVKYTELAMROSVEN 180
 121 PVRDMSHYFKIIEEDLPAQIFANTVDNARIYQIDNARLAADDPRVKYTELAMROSVEN 180
 181 DHGLKRVYIDNTITRLOETEIEALKEELLPMKKHHEEYKGLQAOIASGGLTYEVDAP 240
 181 DHGLKRVYIDNTITRLOETEIEALKEELLPMKKHHEEYKGLQAOIASGGLTYEVDAP 240
 241 KSGDLAKIMADIPAOYDELARKNREELDKYMSQOIEESTVVTQSAEYGAETTLTELR 300
 241 KSGDLAKIMADIPAOYDELARKNREELDKYMSQOIEESTVVTQSAEYGAETTLTELR 300
 301 RTVQSLIEDLDSMRNKLKSLNSLREVEARYALQMOQLNGILHLESLAQTRAEQORA 360
 301 RTVQSLIEDLDSMRNKLKSLNSLREVEARYALQMOQLNGILHLESLAQTRAEQORA 360
 361 QAEYBALNINKVLEAEIATYRRLLEDGEDFNLGDALDSNSMOTIOKTTTRIVDGKVS 420
 361 QAEYBALNINKVLEAEIATYRRLLEDGEDFNLGDALDSNSMOTIOKTTTRIVDGKVS 420
 421 ETNDTKVLRLH 430
 421 ETNDTKVLRLH 430
 421 ETNDTKVLRLH 430

RESULT 2

18463
 keratin, type I, cytoskeletal - mouse

N/A:Accession: Mus musculus (house mouse)

C/Species: Mus musculus (house mouse)

C/Date: 02-Aug-1996 #sequence revision 02-Aug-1996 #text_change 09-Jul-2004

A/Accession: 159463; A25621; A28428; J0406

R/Alonso, A.; Weber, T.; Jorcano, J.L.

Roux's Arch. Dev. Biol. 196, 16-21, 1987

A/Title: Cloning and characterization of keratin D, a murine endodermal cytoskeletal pro

A/Reference number: 159463

A/Accession: 159463

A/Status: preliminary; translated from GB/EMBL/DBD

A/Molecule type: mRNA

A/Residues: 1-423 <RES>

A/Cross-references: UNIPROT:P05784; GB:M6376; NID:g198587; PIDN:AAA39373.1; PID:g293682

R/Singer, P.A.; Trevor, K.; Oshima, R.G.

J. Biol. Chem. 261, 538-547, 1986

A/Title: Molecular cloning and characterization of the endo B cytokeratin expressed in F

A/Reference number: A25621; MUID:8608876; PMID:2416755

A/Accession: A25621

A/Molecule type: mRNA

A/Residues: 1-243; 'D', 245-252, 'A', 254-423 <SIN>

A/Cross-references: GB:M1686; NID:g198620; PIDN:AAA39390.1; PID:g293685

R/Oshima, R.G.; Trevor, K.; Shevinsky, L.H.; Ryder, O.A.; Cecena, G.

Genes Dev. 2, 505-516, 1988

A/Title: Identification of the gene coding for the endo B murine cytokeratin and its met

A/Reference number: A28428; MUID:88255838; PMID:2457868

A/Accession: A28428

A/Molecule type: DNA

A/Residues: 1-132 <DSH>

A/Cross-references: GB:Y00217; NID:g50842; PIDN:CAA68365.1; PID:g50843

R/Chino, Y.; Morita, T.; Zhang, F.; Srimahongkorn, S.; Tondella, M.L.C.; Matsumoto,

Gene 70, 85-95, 1988

A/Title: Nucleotide sequence and structure of the mouse cytokeratin endos gene.

A/Reference number: J0406; MUID:9196920; PMID:2467843

A/Accession: J0406

A/Molecule type: DNA

1 MSFTTRSG-TESTNYSIGSVQAPSYGAPVSSAAYVAGAGSGSRISVRSSTFRGGMG 59
 1 MSFTTRSG-TESTNYSIGSVQAPSYGAPVSSAAYVAGAGSGSRISVRSSTFRGGMG 59
 60 SGGIATGIAGLAGMGIGNEKEKTEWQSLNRLASYLDRVSLSTENRRESEKIREHEKK 119
 60 SGGIATGIAGLAGMGIGNEKEKTEWQSLNRLASYLDRVSLSTENRRESEKIREHEKK 119
 120 GPR-VRDMSHYFKIIEEDLPAQIFANTVDNARIYQIDNARLAADDPRVKYTELAMROS 178
 120 GPR-VRDMSHYFKIIEEDLPAQIFANTVDNARIYQIDNARLAADDPRVKYTELAMROS 178
 179 ENDIHGLKRVYIDNTITRLOETEIEALKEELLPMKKHHEEYKGLQAOIASGGLTYEVD 238
 179 ENDIHGLKRVYIDNTITRLOETEIEALKEELLPMKKHHEEYKGLQAOIASGGLTYEVD 238
 239 KSGDLAKIMADIPAOYDELARKNREELDKYMSQOIEESTVVTQSAEYGAETTLTE 298
 239 KSGDLAKIMADIPAOYDELARKNREELDKYMSQOIEESTVVTQSAEYGAETTLTE 298
 299 LRTVQSLIEDLDSMRNKLKSLNSLREVEARYALQMOQLNGILHLESLAQTRAEQOR 358
 299 LRTVQSLIEDLDSMRNKLKSLNSLREVEARYALQMOQLNGILHLESLAQTRAEQOR 358
 352 QAEYBALNINKVLEAEIATYRRLLEDGEDFNLGDALDSNSMOTIOKTTTRIVDGKV 411
 352 QAEYBALNINKVLEAEIATYRRLLEDGEDFNLGDALDSNSMOTIOKTTTRIVDGKV 411
 419 VSEINDTKVLRLH 430
 419 VSEINDTKVLRLH 430
 412 VSEINDTKVLRLH 423

RESULT 3

A28825

keratin, type I nonepidermal - African clawed frog

C/Species: Xenopus laevis (African clawed frog)

C/Date: 30-Jun-1989 #sequence revision 30-Jun-1989 #text_change 09-Jul-2004

A/Accession: A28825

R/Barltame, S.B.; Jamrich, M.; Richter, K.; Sargent, T.D.; David, I.B.

Genes Dev. 2, 853-862, 1988

A/Title: Xenopus endo B is a keratin preferentially expressed in the embryonic notochord

A/Reference number: A28825; MUID:89092007; PMID:2463213

A/Accession: A28825

A/Molecule type: mRNA

A/Residues: 1-368 <LAF>

A/Cross-references: UNIPROT:P08802; GB:Y00230; NID:g64863; PIDN:CAA68372.1; PID:g64864

A/Start codon: GGT

A/Superfamily: cytoskeletal keratin

C/Keywords: coiled coil

Query Match

Best Local Similarity

Matches 226; Conservative 74; Mismatches 58; Indels 11; Gaps 5;

69 GGLAG-----MGQIQNEKEKTEWQSLNRLASYLDRVSLSTENRRESEKIREHEKKGPQ 122

2 GGFSGASVNVNFGGVQNEKEKTEWQSLNRLASYLDRVSLSTENRRESEKIREHEKKGP 60

123 VRDMSHYFKIIEEDLPAQIFANTVDNARIYQIDNARLAADDPRVKYTELAMROSVENDI 182

61 AKDMSPYMTIEDKPKQVFNISVNSGLVQIDNARLAADDPRVKYSEVALINRSVETDI 120

183 HGLKRVYIDNTITRLOETEIEALKEELLPMKKHHEEYKGLQAOIASGGLTYEVDAPKS 242

121 GGLKRLIDNTNISLNIENEFESKEELLIPKKNHQDVDELQAOIATSAVTYEVDAFKS 180

243 QDLAKIMADIPAOYDELARKNREELDKYMSQOIEESTVVTQSAEYGAETTLTELRRT 302

181 QDLGKIMADIPAOYDEMAQKREDEVERLYOSKVEDDTVQVNLDAALHTAKSSVTELRRT 240